in certain cases, into an arithmetical progression. Thus, having the theorem that N can be resolved into an arithmetical progression when $16\,N+1$ is a square, he is enabled to detect factors in N; he thus shows that 2079519603 has 43 and 101 among its factors. Among theorems which the method gives, may be noticed the following, as one of a peculiar and unstudied class. If in the series 1, 3, 5, 7, &c. four terms be taken, and the next *one* omitted, then the four next terms taken and the next *three* omitted, then four terms taken and *five* omitted, and so on, the four terms taken will in every case consist of numbers prime to one another.

II. Abstract of a Memoir "On the Electric Properties of Insulating or Non-conducting Bodies." By Professor CARLO MATTEUCCI of Pisa. Communicated by Major-General SABINE, R.A., V.P. and Treas. R.S. Received April 14, 1859.

The object of the author in the first part of this memoir is to ascertain by experiment what condition is assumed by insulating or non-conducting bodies in the presence of an electrified body, and in what degree such condition is developed in insulating bodies of different kinds. In a memoir published nearly ten years ago (Ann. de Chim. et de Phys., xxvii. p. 134), he had shown that a cylinder of gum-lac, sulphur, stearic acid, or the like, suspended by a filament of silk, and brought near to a body charged with electricity, begins to oscillate in the same way as a cylinder of metal. The non-conducting cylinder, whilst under the influence of induction, behaves like any body charged with opposite electricities, and returns to its natural state when the induction ceases.

These experiments have now been very carefully repeated with cylinders formed of various insulating substances, made as nearly as possible of the same length and perfectly diselectrized. The air was rendered perfectly dry, and the inducing ball was charged with electricity to a constant degree, measured by the torsion-balance.

After giving a numerical statement of the time of oscillation and the moment of the induced force, as determined by experiment for cylinders of different insulating substances, and after describing other

experiments intended to prove the insulating property of the materials employed, the author goes on to observe that there is but one way of explaining the phenomena in question, namely, by supposing that the individual particles or molecules of the non-conducting cylinder acquire different electrical states at their opposite extremities, and that these electrical states, while they are readily developed and neutralized within each particle, meet with great resistance in passing from one particle to another,—a condition of non-conducting bodies which constitutes the *molecular electric polarization* of Faraday.

The author then gives the result of some experiments on the amount of electrical charge communicated to, or given out by an insulated conducting ball surrounded, at one time by air, at another time by an insulating substance, such as sulphur.

In conclusion, the author thinks that the following propositions may be regarded as rigorously demonstrated by experiment:—

1. The effects produced on insulating cylinders in the presence of an electrified body, depend on the state of *molecular electric polarity* which that body developes in the cylinders; and thus the hypothesis of Faraday is directly demonstrated by experiment.

2. Other circumstances being alike, the insulating power of a substance is greater in proportion as its degree of polarization is weaker.

3. The electric capacity of a conducting body—that is, the quantity of electricity which it acquires when placed in communication with a source of electricity—is much greater when the body is surrounded with sulphur, or some other solid isolating substance, than when surrounded by air. Similarly, the body being electrified from the same source and then surrounded with sulphur, or else surrounded with air, afterwards yields to the same conductor much less electricity in the former case than in the latter.

4. The effects produced by insulating plates interposed between the armatures of a Leyden jar or of a magic square are explained, together with the phenomena previously described, both by the penetration of the electricity into the interior of the insulating substance, and the propagation of electricity along the surface of the plates.